

CLAIMS

What is claimed is:

1. A latching system mountable on a closure for releasably retaining the closure in a closed position by latchingly engaging spaced first and second striker formations stationed near the position of the closure when the closure is in the closed position, comprising:

a) first and second latch assemblies mountable on the closure at spaced locations suitable to enable the first latch assembly to latchingly engage the first striker formation when the closure is in the closed position, and to enable the second latch assembly to latchingly engage the second striker formation when the closure is in the closed position;

b) a first operating mechanism including a control unit mountable on the closure and including an enclosure that houses a first crank arm for pivotal movement about a first pivot axis between a non-operated position and an operated position, and that houses components of a signal responsive relay mechanism having an armature that is connected to the first crank arm for pivoting the first crank arm about the first pivot axis from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of a signal sent from a location remote to the closure, and wherein at least one opening is defined by the enclosure for providing access from outside the enclosure to the first crank arm;

c) a first elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the first latch assembly for being moved along a first path of travel from a normal position of the first elongate link to an actuated position of the

first elongate link to operate the first latch assembly to release latched engagement of the first latch assembly with the first striker formation, and 2) to the first crank arm at a first location along a length of the first crank arm;

d) a second elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the second latch assembly for being moved along a second path of travel from a normal position of the second elongate link to an actuated position of the second elongate link to operate the second latch assembly to release latched engagement of the second latch assembly with the second striker formation, and 2) to the first crank arm at a second location along a length of the first crank arm;

e) whereby, when the first crank arm is pivoted from the non-operated position to the operated position, the first and second links are caused to move along the first and second paths of travel to operate the first and second latch assemblies to substantially concurrently release the latched engagement of the first and second latch assemblies with the first and second striker formations to permit the closure to move away from the closed position.

2. The latching system of Claim 1 wherein the control unit is mountable on the closure at a location between the first and second latch assemblies, the at least one opening defined by the enclosure includes first and second openings located on substantially opposite sides of the enclosure, the first elongate link extends through the first opening, the second elongate link extends through the second opening, and the first and second locations where the first and second elongate links connect with the first crank arm are situated on substantially opposite

sides of the first pivot axis so that, when the first crank arm pivots from the non-operated position to the operated position, the first and second elongate links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

3. The latching system of Claim 1 wherein the enclosure of the control unit includes a base and a cover that cooperate to protectively house the first crank arm and the signal responsive relay mechanism.

4. The latching system of Claim 3 wherein the base is formed primarily from injection molded plastics material, wherein the first crank arm is pivotally connected to the base for pivoting between the non-operated position and the operated position, and the signal responsive relay mechanism is connected to the base.

5. The latching system of Claim 4 wherein the signal responsive relay mechanism includes an electrically operated relay and a signal responsive switch mechanism for supplying electricity to the electrically operated relay to operate the relay to move the armature of the relay to pivot the first crank arm from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of said signal.

6. The latching system of Claim 4 wherein the cover is formed primarily from injection molded plastics material and provides a mounting location where an electric light assembly can be mounted on the cover for illuminating an area exterior to the enclosure of the control unit.

7. The latching system of Claim 6 additionally including an electric light assembly mounted on the cover at said mounting location.

8. The latching system of Claim 1 additionally including:

a) a second operating mechanism connectable to the closure and including interior structure that moves in response to manual operation of an actuator that is accessible from outside the closure;

b) a first actuator link connectable to the first latch assembly and to the interior structure for operating the first latch assembly in response to manual operation of the actuator; and,

c) a second actuator link connectable to the second latch assembly and to the interior structure for operating the second latch assembly in response to manual operation of the actuator.

9. The latching system of Claim 8 wherein the interior structure includes a second crank arm that is pivotal about a second pivot axis from a non-actuated position to an actuated position for moving the first actuator link and the second actuator link to operate the first and second latch assemblies.

10. The latching system of Claim 9 wherein the first actuator link is connectable to the second crank arm at a first site along a length of the second crank arm, and the second actuator link is connectable to the second crank arm at a second site along the length of the second crank arm.

11. The latching system of Claim 10 wherein the second operating mechanism is mountable on the closure at

a station located between the first and second latch assemblies, and the first and second sites where the first and second actuator links connect with the second crank arm are situated on substantially opposite sides of the second pivot axis so that, when the second crank arm pivots about the second pivot axis from the non-actuated position to the actuated position, the first and second actuator links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

12. The latching system of Claim 11 wherein the first latch assembly has a first, one-piece operating arm that connects with the first elongate link and with the first actuator link, and that pivots to operate the first latch assembly in response to movement of a selected one of the first elongate link and the first actuator link, and wherein the second latch assembly has a second, one-piece operating arm that connects with the second elongate link and with the second actuator link, and that pivots to operate the second latch assembly in response to movement of a selected one of the second elongate link and the second actuator link.

13. The latching system of Claim 12 wherein the first and second latch assemblies 1) each have a rotary latch bolt pivotally connected to a latch housing for movement between an unlatched position wherein a generally cylindrical portion of one an associated one of the first and second striker formations is permitted to move into and out of aligned portions of U-shaped notches defined by the latch housing and by the rotary latch bolt, and a latched position wherein the U-shaped notches of the latch housing and of the rotary latch bolt cooperate to latchingly retain the generally cylindrical portion of the

associated one of the first and second striker formations, 2) each have a pawl that is movable between a retention position wherein the pawl engages the bolt to hold the bolt in the latched position, and a release position wherein the pawl permits the rotary latch bolt to pivot to the unlatched position, and 3) each have at least one spring arranged to bias the rotary latch bolt away from the latched position toward the unlatched position, and to bias the pawl away from the release position toward the retention position.

14. An operating mechanism mountable on a closure for operating a latch assembly mounted on the closure to release latched engagement of the latch assembly with a striker formation that retains the closure in a closed position, comprising:

a) a control unit mountable on the closure and including an enclosure that houses a first crank arm for pivotal movement about a first pivot axis between a non-operated position and an operated position, and that houses components of a signal responsive relay mechanism having an armature that is connected to the first crank arm for pivoting the first crank arm about the first pivot axis from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of a signal sent from a location remote to the closure, and wherein an opening is defined by the enclosure for providing access from outside the enclosure to the first crank arm;

c) an elongate link configured to extend through the opening of the enclosure and being connectable 1) to the latch assembly for being moved along a path of travel from a normal position of the elongate link to an actuated position of the link to operate the latch assem-

bly to release latched engagement of the latch assembly with the striker formation; and,

d) whereby, when the first crank arm is pivoted from the non-operated position to the operated position, the elongate link is caused to move along the path of travel to operate the latch assembly to release the latched engagement of the latch assembly with the striker formation to permit the closure to move away from the closed position.

15. The operating mechanism of Claim 14 wherein the enclosure of the control unit includes a base and a cover that cooperate to protectively house the first crank arm and the signal responsive relay mechanism.

16. The operating mechanism of Claim 15 wherein the base is formed primarily from injection molded plastics material, wherein the first crank arm is pivotally connected to the base for pivoting between the non-operated position and the operated position, and the signal responsive relay mechanism is connected to the base.

17. The latching system of Claim 15 wherein the signal responsive relay mechanism includes an electrically operated relay and a signal responsive switch mechanism for supplying electricity to the electrically operated relay to operate the relay to move the armature of the relay to pivot the first crank arm from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of said signal.

18. The latching system of Claim 15 wherein the cover is formed primarily from injection molded plastics material and provides a mounting location where an electric light assembly can be mounted on the cover for

illuminating an area exterior to the enclosure of the control unit.

19. The latching system of Claim 18 additionally including an electric light assembly mounted on the cover at said mounting location.

20. The latching system of Claim 14 additionally including:

a) a second operating mechanism connectable to the closure and including interior structure that moves in response to manual operation of an actuator that is accessible from outside the closure; and,

b) an actuator link connectable to the latch assembly and to the interior structure for operating the latch assembly in response to manual operation of the actuator.

21. The latching system of Claim 20 wherein the interior structure includes a second crank arm that is pivotal about a second pivot axis from a non-actuated position to an actuated position for moving the actuator link to operate the latch assembly.

22. An operating mechanism mountable on a closure for operating a first latch assembly and a second latch assembly mounted on the closure to release latched engagement of the first and second latch assemblies with first and second striker formations that retain the closure in a closed position, comprising:

a) a control unit mountable on the closure and including an enclosure that houses a first crank arm for pivotal movement about a first pivot axis between a non-operated position and an operated position, and that houses components of a signal responsive relay mechanism

having an armature that is connected to the first crank arm for pivoting the first crank arm about the first pivot axis from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of a signal sent from a location remote to the closure, and wherein at least one opening is defined by the enclosure for providing access from outside the enclosure to the first crank arm;

c) a first elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the first latch assembly for being moved along a first path of travel from a normal position of the first elongate link to an actuated position of the first elongate link to operate the first latch assembly to release latched engagement of the first latch assembly with the first striker formation, and 2) to the first crank arm at a first location along a length of the first crank arm;

d) a second elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the second latch assembly for being moved along a second path of travel from a normal position of the second elongate link to an actuated position of the second elongate link to operate the second latch assembly to release latched engagement of the second latch assembly with the second striker formation, and 2) to the first crank arm at a second location along a length of the first crank arm;

e) whereby, when the first crank arm is pivoted from the non-operated position to the operated position, the first and second links are caused to move along the first and second paths of travel to operate the first and second latch assemblies to substantially concurrently release the latched engagement of the first and second latch assemblies with the first and second striker forma-

tions to permit the closure to move away from the closed position.

23. The latching system of Claim 22 wherein the control unit is mountable on the closure at a location between the first and second latch assemblies, the at least one opening defined by the enclosure includes first and second openings located on substantially opposite sides of the enclosure, the first elongate link extends through the first opening, the second elongate link extends through the second opening, and the first and second locations where the first and second elongate links connect with the first crank arm are situated on substantially opposite sides of the first pivot axis so that, when the first crank arm pivots from the non-operated position to the operated position, the first and second elongate links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

24. The latching system of Claim 22 wherein the enclosure of the control unit includes a base and a cover that cooperate to protectively house the first crank arm and the signal responsive relay mechanism.

25. The latching system of Claim 24 wherein the base is formed primarily from injection molded plastics material, wherein the first crank arm is pivotally connected to the base for pivoting between the non-operated position and the operated position, and the signal responsive relay mechanism is connected to the base.

26. The latching system of Claim 25 wherein the signal responsive relay mechanism includes an electrically operated relay and a signal responsive switch mechanism

for supplying electricity to the electrically operated relay to operate the relay to move the armature of the relay to pivot the first crank arm from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of said signal.

27. The latching system of Claim 25 wherein the cover is formed primarily from injection molded plastics material and provides a mounting location where an electric light assembly can be mounted on the cover for illuminating an area exterior to the enclosure of the control unit.

28. The latching system of Claim 27 additionally including an electric light assembly mounted on the cover at said mounting location.

29. The latching system of Claim 22 additionally including:

a) a second operating mechanism connectable to the closure and including interior structure that moves in response to manual operation of an actuator that is accessible from outside the closure;

b) a first actuator link connectable to the first latch assembly and to the interior structure for operating the first latch assembly in response to manual operation of the actuator; and,

c) a second actuator link connectable to the second latch assembly and to the interior structure for operating the second latch assembly in response to manual operation of the actuator.

30. The latching system of Claim 29 wherein the interior structure includes a second crank arm that is pivotal about a second pivot axis from a non-actuated

position to an actuated position for moving the first actuator link and the second actuator link to operate the first and second latch assemblies.

31. The latching system of Claim 30 wherein the first actuator link is connectable to the second crank arm at a first site along a length of the second crank arm, and the second actuator link is connectable to the second crank arm at a second site along the length of the second crank arm.

32. The latching system of Claim 31 wherein the second operating mechanism is mountable on the closure at a station located between the first and second latch assemblies, and the first and second sites where the first and second actuator links connect with the second crank arm are situated on substantially opposite sides of the second pivot axis so that, when the second crank arm pivots about the second pivot axis from the non-actuated position to the actuated position, the first and second actuator links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

33. The latching system of Claim 32 wherein the first latch assembly has a first, one-piece operating arm that connects with the first elongate link and with the first actuator link, and that pivots to operate the first latch assembly in response to movement of a selected one of the first elongate link and the first actuator link, and wherein the second latch assembly has a second, one-piece operating arm that connects with the second elongate link and with the second actuator link, and that pivots to operate the second latch assembly in response to movement

of a selected one of the second elongate link and the second actuator link.

34. The latching system of Claim 33 wherein the first and second latch assemblies 1) each have a rotary latch bolt pivotally connected to a latch housing for movement between an unlatched position wherein a generally cylindrical portion of one an associated one of the first and second striker formations is permitted to move into and out of aligned portions of U-shaped notches defined by the latch housing and by the rotary latch bolt, and a latched position wherein the U-shaped notches of the latch housing and of the rotary latch bolt cooperate to latchingly retain the generally cylindrical portion of the associated one of the first and second striker formations, 2) each have a pawl that is movable between a retention position wherein the pawl engages the bolt to hold the bolt in the latched position, and a release position wherein the pawl permits the rotary latch bolt to pivot to the unlatched position, and 3) each have at least one spring arranged to bias the rotary latch bolt away from the latched position toward the unlatched position, and to bias the pawl away from the release position toward the retention position.

35. A latching system mountable on a closure for latchingly engaging first and second striker formations for holding the closure in a closed position, comprising:

a) first and second latch assemblies mountable on the closure to latchingly engage the striker formations when the closure is in the closed position, and functioning, when operated, to release latched engagement with the striker formations;

b) a first operating mechanism mountable on the closure being connectable to the first and second latch assemblies for operating the first and second latch assemblies substantially concurrently in response to manual actuation of the first operating mechanism;

c) a second operating mechanism mountable on the closure for substantially concurrently operating the first and second latch assemblies in response to receipt of a remotely sent signal, including:

i) a control unit mountable on the closure and including an enclosure that houses a first crank arm for pivotal movement about a first pivot axis between a non-operated position and an operated position, and that houses components of a signal responsive relay mechanism having an armature that is connected to the first crank arm for pivoting the first crank arm about the first pivot axis from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of a signal sent from a location remote to the closure, and wherein at least one opening is defined by the enclosure for providing access from outside the enclosure to the first crank arm;

ii) a first elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the first latch assembly for being moved along a first path of travel from a normal position of the first elongate link to an actuated position of the first elongate link to operate the first latch assembly to release latched engagement of the first latch assembly with the first striker formation, and 2) to the first crank arm at a

first location along a length of the first crank arm;

iii) a second elongate link configured to extend through the at least one opening of the enclosure and being connectable 1) to the second latch assembly for being moved along a second path of travel from a normal position of the second elongate link to an actuated position of the second elongate link to operate the second latch assembly to release latched engagement of the second latch assembly with the second striker formation, and 2) to the first crank arm at a second location along a length of the first crank arm;

iv) whereby, when the first crank arm is pivoted from the non-operated position to the operated position, the first and second links are caused to move along the first and second paths of travel to operate the first and second latch assemblies to substantially concurrently release the latched engagement of the first and second latch assemblies with the first and second striker formations to permit the closure to move away from the closed position.

36. The latching system of Claim 35 wherein the control unit is mountable on the closure at a location between the first and second latch assemblies, the at least one opening defined by the enclosure includes first and second openings located on substantially opposite sides of the enclosure, the first elongate link extends through the first opening, the second elongate link extends through the second opening, and the first and second locations where the first and second elongate links connect with the first crank arm are situated on substantially opposite

sides of the first pivot axis so that, when the first crank arm pivots from the non-operated position to the operated position, the first and second elongate links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

37. The latching system of Claim 35 wherein the enclosure of the control unit includes a base and a cover that cooperate to protectively house the first crank arm and the signal responsive relay mechanism.

38. The latching system of Claim 37 wherein the base is formed primarily from injection molded plastics material, wherein the first crank arm is pivotally connected to the base for pivoting between the non-operated position and the operated position, and the signal responsive relay mechanism is connected to the base.

39. The latching system of Claim 38 wherein the signal responsive relay mechanism includes an electrically operated relay and a signal responsive switch mechanism for supplying electricity to the electrically operated relay to operate the relay to move the armature of the relay to pivot the first crank arm from the non-operated position to the operated position in response to receipt by the signal responsive relay mechanism of said signal.

40. The latching system of Claim 38 wherein the cover is formed primarily from injection molded plastics material and provides a mounting location where an electric light assembly can be mounted on the cover for illuminating an area exterior to the enclosure of the control unit.

41. The latching system of Claim 40 additionally including an electric light assembly mounted on the cover at said mounting location.

42. The latching system of Claim 35 additionally including:

a) a second operating mechanism connectable to the closure and including interior structure that moves in response to manual operation of an actuator that is accessible from outside the closure;

b) a first actuator link connectable to the first latch assembly and to the interior structure for operating the first latch assembly in response to manual operation of the actuator; and,

c) a second actuator link connectable to the second latch assembly and to the interior structure for operating the second latch assembly in response to manual operation of the actuator.

43. The latching system of Claim 42 wherein the interior structure includes a second crank arm that is pivotal about a second pivot axis from a non-actuated position to an actuated position for moving the first actuator link and the second actuator link to operate the first and second latch assemblies.

44. The latching system of Claim 43 wherein the first actuator link is connectable to the second crank arm at a first site along a length of the second crank arm, and the second actuator link is connectable to the second crank arm at a second site along the length of the second crank arm.

45. The latching system of Claim 44 wherein the second operating mechanism is mountable on the closure at

a station located between the first and second latch assemblies, and the first and second sites where the first and second actuator links connect with the second crank arm are situated on substantially opposite sides of the second pivot axis so that, when the second crank arm pivots about the second pivot axis from the non-actuated position to the actuated position, the first and second actuator links move in substantially opposite directions to substantially concurrently operate the first and second latch assemblies.

46. The latching system of Claim 45 wherein the first latch assembly has a first, one-piece operating arm that connects with the first elongate link and with the first actuator link, and that pivots to operate the first latch assembly in response to movement of a selected one of the first elongate link and the first actuator link, and wherein the second latch assembly has a second, one-piece operating arm that connects with the second elongate link and with the second actuator link, and that pivots to operate the second latch assembly in response to movement of a selected one of the second elongate link and the second actuator link.

47. The latching system of Claim 46 wherein the first and second latch assemblies 1) each have a rotary latch bolt pivotally connected to a latch housing for movement between an unlatched position wherein a generally cylindrical portion of one an associated one of the first and second striker formations is permitted to move into and out of aligned portions of U-shaped notches defined by the latch housing and by the rotary latch bolt, and a latched position wherein the U-shaped notches of the latch housing and of the rotary latch bolt cooperate to latchingly retain the generally cylindrical portion of the

associated one of the first and second striker formations, 2) each have a pawl that is movable between a retention position wherein the pawl engages the bolt to hold the bolt in the latched position, and a release position wherein the pawl permits the rotary latch bolt to pivot to the unlatched position, and 3) each have at least one spring arranged to bias the rotary latch bolt away from the latched position toward the unlatched position, and to bias the pawl away from the release position toward the retention position.